New England Bioassay
A Division of GZA

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

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NEW ENGLAND BIOASSAY A DIVISION OF GZA
CHRONIC AQUATIC TOXICITY TEST REPORT

Permitee: Barnhardt Manufacturing Co. NPDES # MA0003697
Report submitted to: 247 Main Road
Colrain, MA 01340
Sample ID: Effluent
Test Month/Year: January 2019
NEB Proj # 05.0044654.00

Test Type / Method: *Ceriodaphnia dubia* Modified Chronic Static-Renewal Freshwater Test Method 1002.0; EPA 821-R-02-013

Effluent Sample Dates: #1 1/6-7/19 #2 1/8-9/19 #3 1/10-11/19

Test Start Date: 1/7/19

Results Summary

Your results were as follows:

Fail - Please proceed according to the instructions in your permit

Acute Test Results

Species	LC50	A-NOEC	Permit Limit	Pass / Fail
Ceriodaphnia dubia	58.3%	50%	≥ 100%	Fail

Chronic Test Results

Species	C-NOEC	C-LOEC	IC25	Permit Limit	Pass/Fail
Ceriodaphnia dubia	< 5.0%	5.0%	4.9%	≥ 5.0%	Fail

Data Qualifiers affecting this test:

Certifications & Approvals: NH ELAP (2071), NJ DEP (CT405)

Test Report Certification

Permittee name:	Barnhardt Manufacturing Co.	Permit number:	MA0003697
Client sample ID:	Effluent	Test Start Date:	1/7/19

Whole Effluent Toxicity Test Report Certification (Permittee)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: _____ (Date)

_____ Authorized Signature

_____ Print or Type Name and Title

_____ Print or Type the Permittee's Name

MA0003697
Print or Type the NPDES Permit Number

Whole Effluent Toxicity Test Report Certification (Bioassay Laboratory)

The results reported relate only to the samples submitted as received

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: 1/22/19 (Date)

Kimberly Wills
Laboratory Manager
New England Bioassay a division of GZA

General Test Conditions

Permittee name: Barnhardt Manufacturing Co. Permit number: MA0003697

Client sample ID: Effluent Test Start Date: 1/7/19

Sample Collection Information

Effluent #1 Dates/Times: 1/6-7/19 @ 0700-0700 Receiving Water #1 Date/Time: 1/7/19 @ 0730

Effluent #2 Dates/Times: 1/8-9/19 @ 0700-0700 Receiving Water #2 Date/Time: 1/9/19 @ 0730

Effluent #3 Dates/Times: 1/10-11/19 @ 0700-0700 Receiving Water #3 Date/Time: 1/11/19 @ 0730

Were a minimum of three samples collected? Yes ☑ No ☐ *(see note below)

Were samples used within the first 36 hours of collection? Yes ☑ No ☐ * (see note below)

* sample collection note:

Test Conditions

Permittee's Receiving Water: North River

- Dilution water: Receiving water collected at a point immediately upstream of or away from the discharge
- Control water: Connecticut River adjusted to moderate hardness (hardness 80 - 100 mg/L CaCO3)

Effluent concentrations tested: 0%, 5.0%, 6.25%, 12.5%, 25%, 50%, 100%

Was effluent salinity adjusted? No ☑ Yes ☐ with Instant Ocean sea salts to _____ ppt

Dechlorination procedures: Chlorine is measured using 4500 CL-G DPD Colorimetric Method

- Dechlorination was not required

TRC results and further information about aeration of samples can be found attached in "sample receipt chemistry"

Reference Toxicant Data

Ceriodaphnia dubia

Date: 1/2/19

Toxicant: Sodium chloride

Dilution Water: NEB CTRMH

Organism Source: NEB

Reproduction IC25: 1.19 g/L

Results within range Yes ☑ No ☐

Ceriodaphnia dubia Test Results

Permittee name: Barnhardt Manufacturing Co. Permit number: MA0003697

Client sample ID: Effluent Test Dates: 1/7/19 - 1/13/19

Test Acceptability Criteria

Lab Control Survival: 100 % Mean Lab Control Reproduction: 41.6 young per female

Diluent Control Survival: 90 % Mean Diluent Control Reproduction: 27.3 young per female

Thiosulfate Control Survival: NA % Mean Thiosulfate Control Reproduction: NA young per female

Presence of an asterisk (*) indicates EPA criteria was not met, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Results

		Permit Limit	Test Result	Pass/Fail Status
Acute Data	48 hr LC50	≥ 100%	58.3%	Fail
	48 hr NOEC		50%	
	TUa			
Chronic Data	Chronic LC50		56.2%	
	Survival C-NOEC		50%	
	Survival C-LOEC		>50%	
	Reproduction C-NOEC		<5.0%	
	Reproduction C-LOEC		5.0%	
	Reproduction IC25		4.9%	
	Reproduction IC50		14.0%	
	Reportable C-NOEC	≥ 5.0%	< 5.0%	Fail
	Reportable C-LOEC		5.0%	
	MATC		< 5.0%	
	TUc			

Presence of an asterisk (*) indicates qualified data, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Variability

Reproduction PMSD: 24.1% Upper & Lower EPA bounds: 13 - 47% ☐ Low ☑ Within bounds ☐ High

☐ PMSD exceeds upper bounds. Test results are highly variable and may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC)

☑ The PMSD falls within the upper (47%) and lower (13%) bounds. Results are reportable.

☐ PMSD falls below the lower bound test variability criterion. The test is very sensitive. The relative percent difference (RPD) between the control and each treatment was calculated and compared to the lower bound.

- ☐ The RPD values for all concentrations fall below the lower bound. Any differences observed in this test are considered statistically insignificant.
- ☐ Some of the concentrations that were flagged as statistically significant have RPD values that fall below the lower bound. Any differences observed in these concentrations will not be considered statistically significantly decreased from the control.
- ☐ No statistically significant reductions were observed in this test.

Ceriodaphnia dubia Test Results

Permittee name: Barnhardt Manufacturing Co. Permit number: MA0003697

Client sample ID: Effluent Test Dates: 1/7/19 - 1/13/19

Concentration - Response Evaluation

Survival: #7 The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000: #7 Significant effects only at highest concentration.

Reproduction: #9 The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000: #9 Significant effects at all test concentrations with a sloped concentration-response curve.

The concentration - response relationship was reviewed and the following determination was made:

Survival	Reproduction	
X	X	Results are reliable and reportable
		Results are anomalous (see explanation below)
		Results are inconclusive - retest (see explanation below)

Results Discussion (if applicable):

TEST METHODS

Ceriodaphnia dubia

Test type:	Modified Chronic Static Renewal Freshwater Test
Test Reference Manual:	EPA-821-R-02-013 "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms"
Test Method:	*Ceriodaphnia dubia* Survival and Reproduction Test - EPA 1002.0
Temperature:	25 ˚C ± 1˚C (Temperatures should not deviate by more than 3˚C during the test) (required)
Light Quality:	Ambient Laboratory Illumination (recommended)
Light Intensity:	10-20 µE/m2/s, or 50-100 ft-c (recommended)
Photoperiod:	16 hours light, 8 hours dark (recommended)
Test chamber size:	30 mL (recommended minimum)
Test solution volume:	15 mL (recommended minimum)
Renewal of Test Solutions:	Daily (required)
Age of Test Organisms:	Less than 24 hours; and all released within a 8-h period (required)
Number of Neonates Per Test Chamber:	1 Assigned using blocking by known parentage (required)
Number of Replicate Test Chambers Per Treatment:	10 (required minimum)
Number of Neonates Per Test Concentration:	10 (required minimum)
Feeding Regime:	Fed 0.1 mL each of YCT and algal suspension per exposure chamber daily. (recommended)
Cleaning:	Use new plastic cups daily (recommended)
Aeration:	None (recommended)
Test Duration:	Until 60% or more of control females have three broods (maximum test duration 8 days) (required)
Endpoints:	Survival and reproduction (required)
Test Acceptability:	80% or greater survival of all control organisms and an average of 15 or more young per surviving female in the control solutions. 60% of surviving control females must produce three broods. (required)
Sampling Requirements:	Minimum of three samples with a maximum holding time of 36 hours before first use. (required)
Sample volume required:	1 L/Day (recommended)

CERIODAPHNIA DUBIA
DATASHEETS & STATISTICAL ANALYSIS

NEW ENGLAND BIOASSAY TOXICITY DATA FORM
CHRONIC COVER SHEET

CLIENT:	Barnhardt Manufacturing Co.	*C.dubia* TEST ID #	19-39
ADDRESS:	247 Main Road	CHAIN OF CUSTODY #	C39-1008/09
	Colrain, MA 01340	NEB PROJECT #	05.0044654.00
PERMITTEE:	Barnhardt Manufacturing Co.	SAMPLE ID:	Effluent
PERMIT NUMBER:	MA0003697		
DILUTION WATER:	North River		

INVERTEBRATES

TEST SET-UP TECHNICIAN:	MM
TEST SPECIES:	*Ceriodaphnia dubia*
NEB LOT #	Cd18(RMH 304)
AGE:	< 24 hours
TEST SOLUTION VOLUME (mls):	15
ORGANISMS PER TEST CHAMBER:	1
ORGANISMS PER CONCENTRATION:	10

LABORATORY CONTROL WATER (CTRMH)

Lot Number	Hardness mg/L $CaCO_3$	Alkalinity mg/L $CaCO_3$
CTR18(MH012)	98	60

	DATE	TIME
TEST START:	1/7/19	1215
TEST END:	1/13/19	1203

COMMENTS: _____

REVIEWED BY: _____ DATE: 1/22/19

NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADDRESS:	Barnhardt, 247 Main Rd, Colrain MA 01340				
NEB PROJECT NUMBER:	05.0044654.00		NEB TEST NUMBER:	19-39	COC # C39-1008/09
TEST ORGANISM:	*Ceriodaphnia dubia*		AGE:	<24 hours	Lot # Cd18(RMH 304)
START DATE:	1/7/19	TIME: 1215	END DATE:	1/13/19	TIME: 1203

Effluent Concentration	Cup #	A2	A3	A4	A6	A8	A9	A10	A12	A13	B4	Total Live Young	# Live Adults	Analyst-Transfer	Analyst-Counts
		Culture Lot#				Cd18(RMH 304)									
	Day Number	Replicate													
		A	B	C	D	E	F	G	H	I	J				
NEB Lab Control	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	MM	
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	PD	
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	PD	
	3	9	6	8	6	6	8	8	8	8	7	74	10	CH	CH
	4	13	14	16	13	16	13	14	14	13	11	137	10	CH	CH
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	CH	CH
	6	22	23	22	21	13	19	20	24	21	20	205	10	PD	PD
	7														
	totals	44	43	46	40	35	40	42	46	42	38	416	10		MC
North River Diluent		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	7	4	5	5	6	5	7	7	6	7	59	10		
	4	13	9	14	10	8	9	6	11	9	2/x	91	9		
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	0	9		
	6	20	12	10	9	14	20	13	11	14	X	123	9		
	7														
	totals	40	25	29	24	28	34	26	29	29	9	273	9		
5.0%		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	6	6	5	7	6	5	5	6	6	4	56	10		
	4	5	7	6	7	6	7	5	✓/x	8	6	57	9		
	5	✓	✓	✓	✓	✓	✓	✓	X	✓/x	✓	0	8		
	6	10	11	12	12	11	13	12	X	X	10	91	8		
	7														
	totals	21	24	23	26	23	25	22	6	14	20	204	8		

Notes: Adults producing no neonates were identified as non-reproducing females at test termination.

NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADDRESS:	Barnhardt, 247 Main Rd, Colrain MA 01340		
NEB PROJECT NUMBER:	05.0044654.00	ORGANISM: *Ceriodaphnia dubia*	START DATE: 1/7/19

Effluent Concentration	Day Number	Replicate										Total Live Young	# Live Adults		
		A	B	C	D	E	F	G	H	I	J				
6.25%	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓/x	✓	✓	✓	✓/x	✓	✓	0	8		
	3	7	5	6	X	5	3	7	X	6	6	45	8		
	4	2	4	5	X	8	4	8	X	9	8	48	8		
	5	✓/x	✓	✓	X	✓	✓	✓	X	✓/x	✓	0	6		
	6	X	11	12	X	10	6	13	X	X	7	59	6		
	7														
	totals	9	20	23	0	23	13	28	0	15	21	152	6		
12.5%		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	5	7	6	5	7	5	6	6	4	5	56	10		
	4	5	6	7	10	7	6	9	7	8	8	73	10		
	5	✓/x	✓	✓/x	✓	✓	✓	✓	✓	✓/x	✓	0	7		
	6	X	4	X	✓	✓	✓	9	3	X	10	26	7		
	7														
	totals	10	17	13	15	14	11	24	16	12	23	155	7		
25%		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	✓	✓	✓	✓	3	✓	1	4	✓	✓	8	10		
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	6	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	10		
	7														
	totals	1	0	0	0	3	0	1	4	0	0	9	10		
50%		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓/x	✓	✓	✓	✓	✓	0	9		
	3	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	0	9		
	4	✓	✓	✓	✓	X	✓/x	✓	✓	✓	✓	0	8		
	5	✓	✓/x	✓	✓	X	X	✓	✓	✓	✓	0	7		
	6	✓	X	✓	✓	X	X	✓	✓	✓	✓	0	7		
	7														
	totals	0	0	0	0	0	0	0	0	0	0	0	7		

NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADDRESS:	Barnhardt, 247 Main Rd, Colrain MA 01340		
NEB PROJECT NUMBER:	05.0044654.00	ORGANISM: *Ceriodaphnia dubia*	START DATE: 1/7/19

Effluent Concentration	Day Number	Replicates										Total Live Young	# Live Adults		
		A	B	C	D	E	F	G	H	I	J				
100%	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓/x	✓/x	✓/x	✓/x	✓/x	✓/x	✓/x	✓/x	0	8		
	2	✓/x	✓/x	X	X	X	X	X	X	X	X	0	0		
	3	X	X	X	X	X	X	X	X	X	X	0	0		
	4	X	X	X	X	X	X	X	X	X	X	0	0		
	5	X	X	X	X	X	X	X	X	X	X	0	0		
	6	X	X	X	X	X	X	X	X	X	X	0	0		
	7														
	totals	0	0	0	0	0	0	0	0	0	0	0	0		

Ceriodaphnia 7-d Survival and Reproduction Test — **New England Bioassay**

Analysis ID:	19-9963-9449	**Endpoint:**	2d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:21	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1
Batch ID:	14-0285-9387	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	
Start Date:	07 Jan-19 12:15	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Receiving Water
Ending Date:	13 Jan-19 12:03	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Test Length:	6d	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	11-1016-4064	**Code:**	422BC260	**Project:**	
Sample Date:	07 Jan-19 07:00	**Material:**	Not Applicable	**Source:**	Barnhardt (BBA Fiberweb)
Receipt Date:	07 Jan-19 11:10	**CAS (PC):**		**Station:**	
Sample Age:	5h	**Client:**	Barnhardt		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	0.00%	1.766	0.04679	58.34	47.03	72.37

2d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
5		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
6.25		10	0.8000	0.0000	1.0000	0.4216	52.70%	20.0%	8/10	0.9333	6.67%
12.5		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.9333	6.67%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.9333	6.67%
50		10	0.9000	0.0000	1.0000	0.3162	35.14%	10.0%	9/10	0.9	10.0%
100		10	0.0000	0.0000	0.0000	0.0000		100.0%	0/10	0	100.0%

2d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

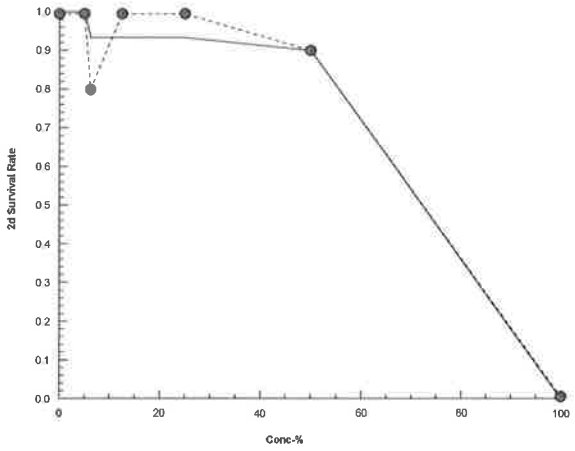
2d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	0/1	1/1	1/1	1/1	0/1	0/1	1/1
12.5		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
100		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Ceriodaphnia 7-d Survival and Reproduction Test **New England Bioassay**

Analysis ID:	19-9963-9449	**Endpoint:**	2d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:21	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **New England Bioassay**

Analysis ID:	11-1170-5641	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4		
Analyzed:	15 Jan-19 14:21	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1		
Batch ID:	14-0285-9387	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**			
Start Date:	07 Jan-19 12:15	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Receiving Water		
Ending Date:	13 Jan-19 12:03	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable		
Test Length:	6d	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	11-1016-4064	**Code:**	422BC260	**Project:**			
Sample Date:	07 Jan-19 07:00	**Material:**	Not Applicable	**Source:**	Barnhardt (BBA Fiberweb)		
Receipt Date:	07 Jan-19 11:10	**CAS (PC):**		**Station:**			
Sample Age:	5h	**Client:**	Barnhardt				

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0.1	11.11%	1.75	0.08474	56.22	38.06	83.06

6d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	10	0.9000	0.0000	1.0000	0.3162	35.14%	0.0%	9/10	0.9	0.0%
5		10	0.8000	0.0000	1.0000	0.4216	52.70%	11.11%	8/10	0.8	11.11%
6.25		10	0.6000	0.0000	1.0000	0.5164	86.07%	33.33%	6/10	0.7667	14.81%
12.5		10	0.7000	0.0000	1.0000	0.4830	69.01%	22.22%	7/10	0.7667	14.81%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	-11.11%	10/10	0.7667	14.81%
50		10	0.7000	0.0000	1.0000	0.4830	69.01%	22.22%	7/10	0.7	22.22%
100		10	0.0000	0.0000	0.0000	0.0000		100.0%	0/10	0	100.0%

6d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000
6.25		0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
12.5		0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

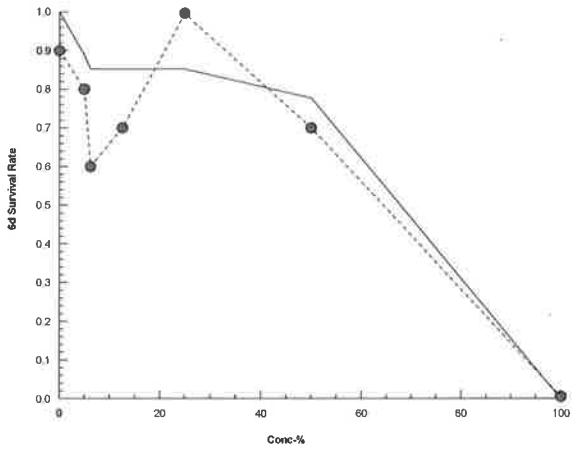
6d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	0/1	1/1	1/1	1/1	0/1	0/1	1/1
12.5		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
100		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Ceriodaphnia 7-d Survival and Reproduction Test **New England Bioassay**

Analysis ID:	11-1170-5641	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:21	**Analysis:**	Trimmed Spearman-Kärber	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **New England Bioassay**

Analysis ID:	10-3976-0983	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4		
Analyzed:	15 Jan-19 14:26	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1		
Batch ID:	14-0285-9387	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**			
Start Date:	07 Jan-19 12:15	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Receiving Water		
Ending Date:	13 Jan-19 12:03	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable		
Test Length:	6d	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	11-1016-4064	**Code:**	422BC260	**Project:**			
Sample Date:	07 Jan-19 07:00	**Material:**	Not Applicable	**Source:**	Barnhardt (BBA Fiberweb)		
Receipt Date:	07 Jan-19 11:10	**CAS (PC):**		**Station:**			
Sample Age:	5h	**Client:**	Barnhardt				

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	50	>50	n/a	2

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Dilution Water		5	0.5000	Exact	1.0000	Non-Significant Effect
		6.25	0.1517	Exact	0.7585	Non-Significant Effect
		12.5	0.2910	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	0.2910	Exact	1.0000	Non-Significant Effect

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	D	9	1	10	0.9	0.1	0.0%
5		8	2	10	0.8	0.2	11.11%
6.25		6	4	10	0.6	0.4	33.33%
12.5		7	3	10	0.7	0.3	22.22%
25		10	0	10	1	0	-11.11%
50		7	3	10	0.7	0.3	22.22%

6d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000
6.25		0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
12.5		0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000

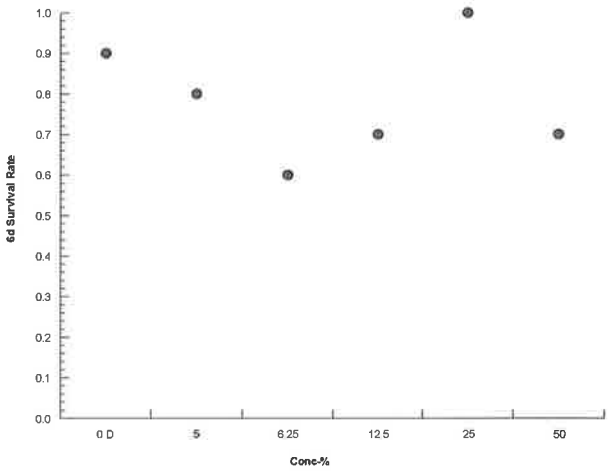
6d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
5		1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1
6.25		0/1	1/1	1/1	0/1	1/1	1/1	1/1	0/1	0/1	1/1
12.5		0/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	0/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test **New England Bioassay**

Analysis ID:	10-3976-0983	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:26	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **New England Bioassay**

Analysis ID:	01-0478-8489	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	14-0285-9387	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	
Start Date:	07 Jan-19 12:15	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Receiving Water
Ending Date:	13 Jan-19 12:03	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Test Length:	6d	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	11-1016-4064	**Code:**	422BC260	**Project:**	
Sample Date:	07 Jan-19 07:00	**Material:**	Not Applicable	**Source:**	Barnhardt (BBA Fiberweb)
Receipt Date:	07 Jan-19 11:10	**CAS (PC):**		**Station:**	
Sample Age:	5h	**Client:**	Barnhardt		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	<5	5	n/a	>20	24.07%

Steel Many-One Rank Sum Test

Control	vs	Control II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		5*	68.5	76	3	18	Asymp	0.0104	Significant Effect
		6.25*	66	76	2	18	Asymp	0.0058	Significant Effect
		12.5*	65.5	76	1	18	Asymp	0.0052	Significant Effect
		25*	55	76	0	18	Asymp	3.1E-04	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	27.3	15	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3758.52	939.63	4	21.49	<1.0E-37	Significant Effect
Error	1967.5	43.7222	45			
Total	5726.02		49			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	23.61	13.28	9.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9219	0.9367	0.0028	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	27.3	21.62	32.98	28.5	9	40	2.512	29.10%	0.00%
5		10	20.4	16.07	24.73	22.5	6	26	1.916	29.70%	25.27%
6.25		10	15.2	8.258	22.14	17.5	0	28	3.069	63.85%	44.32%
12.5		10	15.5	12.11	18.89	14.5	10	24	1.5	30.60%	43.22%
25		10	0.9	-0.1367	1.937	0	0	4	0.4583	161.02%	96.70%
50		10	0	0	0	0	0	0	0		100.00%

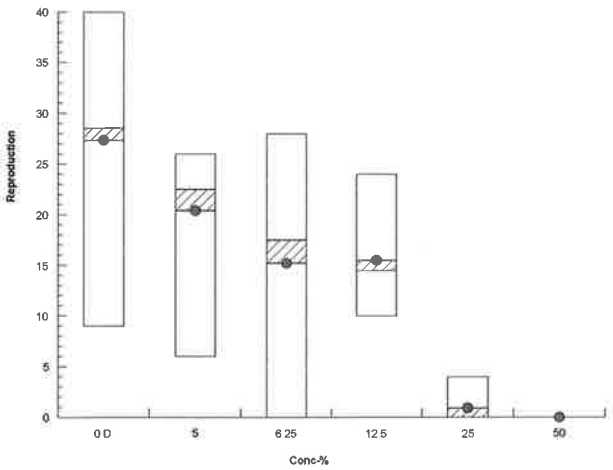
Reproduction Detail

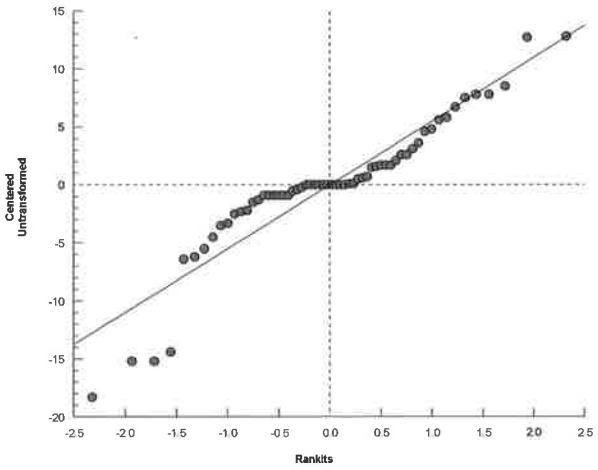
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	40	25	29	24	28	34	26	29	29	9
5		21	24	23	26	23	25	22	6	14	20
6.25		9	20	23	0	23	13	28	0	15	21
12.5		10	17	13	15	14	11	24	16	12	23
25		1	0	0	0	3	0	1	4	0	0
50		0	0	0	0	0	0	0	0	0	0

Ceriodaphnia 7-d Survival and Reproduction Test **New England Bioassay**

Analysis ID:	01-0478-8489	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **New England Bioassay**

Analysis ID:	18-6754-6071	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:29	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	14-0285-9387	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	
Start Date:	07 Jan-19 12:15	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Receiving Water
Ending Date:	13 Jan-19 12:03	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Test Length:	6d	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	11-1016-4064	**Code:**	422BC260	**Project:**	
Sample Date:	07 Jan-19 07:00	**Material:**	Not Applicable	**Source:**	Barnhardt (BBA Fiberweb)
Receipt Date:	07 Jan-19 11:10	**CAS (PC):**		**Station:**	
Sample Age:	5h	**Client:**	Barnhardt		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	383443	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	27.3	15	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	4.946	3.04	7.054	20.22	14.18	32.89
IC50	13.97	5.909	16.2	7.158	6.171	16.92

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**Mean**	**%Effect**
0	D	10	27.3	9	40	7.945	29.10%	0.0%	27.3	0.0%
5		10	20.4	6	26	6.059	29.70%	25.27%	20.4	25.27%
6.25		10	15.2	0	28	9.705	63.85%	44.32%	15.35	43.77%
12.5		10	15.5	10	24	4.743	30.60%	43.22%	15.35	43.77%
25		10	0.9	0	4	1.449	161.00%	96.7%	0.9	96.7%
50		10	0	0	0	0		100.0%	0	100.0%
100		10	0	0	0	0		100.0%	0	100.0%

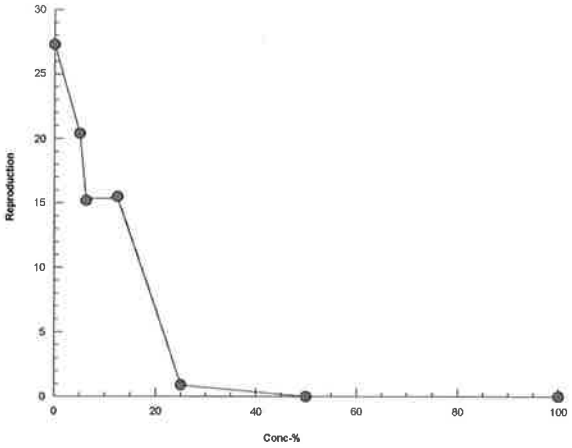
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	40	25	29	24	28	34	26	29	29	9
5		21	24	23	26	23	25	22	6	14	20
6.25		9	20	23	0	23	13	28	0	15	21
12.5		10	17	13	15	14	11	24	16	12	23
25		1	0	0	0	3	0	1	4	0	0
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0

Ceriodaphnia 7-d Survival and Reproduction Test **New England Bioassay**

Analysis ID:	18-6754-6071	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Jan-19 14:29	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

FACILITY NAME & ADDRESS:	Barnhardt, 247 Main Rd, Colrain MA 01340							
NEB PROJECT NUMBER:	05.0044654.00			TEST ORGANISM			*Ceriodaphnia dubia*	
DILUTION WATER SOURCE:	North River			START DATE:			1/7/19	TIME: 1215
ANALYST	MM	TBP	MM	CW	TBP	CH		
NEB Lab Control	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.5	25.1	25.3	24.9	24.4	24.4		
D.O. mg/L Initial	8.4	8.3	8.0	8.2	8.4	8.5		
pH s.u. Initial	7.7	7.8	7.7	7.8	7.8	7.8		
Conductivity µS Initial	428	446	427	424	428	427		
Temp °C Final	24.0	24.6	24.0	24.0	24.0	24.5		
D.O. mg/L Final	8.2	8.1	8.2	8.4	8.6	8.3		
pH s.u. Final	7.4	7.5	7.8	7.9	8.0	8.1		
Conductivity µS Final	485	469	457	472	471	473		
North River Diluent	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.8	26.0	25.4	24.9	24.7	24.7		
D.O. mg/L Initial	11.7	9.5	10.7	9.0	10.3	9.1		
pH s.u. Initial	7.1	7.3	7.4	7.9	7.3	7.7		
Conductivity µS Initial	83	85	93	94	88	92		
Temp °C Final	24.0	24.5	24.0	24.0	24.0	24.5		
D.O. mg/L Final	8.2	8.0	8.1	8.3	8.4	8.2		
pH s.u. Final	7.6	7.5	7.9	8.0	7.8	7.9		
Conductivity µS Final	102	95	111	112	107	105		
5.0%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.6	26.0	24.7	24.7	24.6	24.6		
D.O. mg/L Initial	11.5	9.4	10.7	9.1	10.0	9.0		
pH s.u. Initial	7.3	7.5	7.5	7.8	7.5	7.7		
Conductivity µS Initial	206	191	217	215	232	211		
Temp °C Final	24.0	24.7	24.0	24.0	24.0	24.5		
D.O. mg/L Final	8.3	8.0	8.1	8.3	8.4	8.2		
pH s.u. Final	7.9	7.8	8.0	8.0	8.2	8.1		
Conductivity µS Final	225	205	240	238	247	225		
6.25%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.6	26.0	24.6	24.8	24.6	24.6		
D.O. mg/L Initial	11.4	9.4	10.5	9.3	10.1	9.0		
pH s.u. Initial	7.5	7.6	7.6	7.8	7.7	7.8		
Conductivity µS Initial	242	226	251	257	264	263		
Temp °C Final	24.0	24.8	24.0	24.0	24.0	24.4		
D.O. mg/L Final	8.3	8.0	8.1	8.4	8.4	8.2		
pH s.u. Final	8.1	8.0	8.1	8.1	8.3	8.3		
Conductivity µS Final	259	248	277	283	286	287		

NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

FACILITY NAME & ADDRESS:	Barnhardt, 247 Main Rd, Colrain MA 01340							
NEB PROJECT NUMBER:	05.0044654.00			TEST ORGANISM			*Ceriodaphnia dubia*	
DILUTION WATER SOURCE:	North River			START DATE:			1/7/19 TIME:	1215
12.5%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.6	26.0	24.6	24.8	24.6	24.6		
D.O. mg/L Initial	11.2	9.3	10.3	9.4	10.0	8.9		
pH s.u. Initial	7.9	8.0	7.8	8.0	7.9	8.1		
Conductivity µS Initial	405	404	384	428	414	431		
Temp °C Final	24.0	24.8	24.0	24.0	24.0	24.6		
D.O. mg/L Final	8.3	8.1	8.1	8.4	8.4	8.3		
pH s.u. Final	8.4	8.3	8.4	8.3	8.6	8.6		
Conductivity µS Final	433	425	411	461	454	457		
25%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.6	26.0	24.6	24.7	24.7	24.6		
D.O. mg/L Initial	10.9	9.3	10.1	9.4	9.9	8.8		
pH s.u. Initial	8.2	8.3	8.2	8.2	8.3	8.3		
Conductivity µS Initial	755	723	782	763	806	810		
Temp °C Final	24.0	24.8	24.0	24.0	24.0	24.5		
D.O. mg/L Final	8.3	8.1	8.1	8.4	8.4	8.2		
pH s.u. Final	8.7	8.7	8.7	8.6	8.9	8.9		
Conductivity µS Final	811	773	830	850	847	875		
50%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.6	26.0	24.6	24.7	24.9	24.4		
D.O. mg/L Initial	10.3	9.2	9.6	9.3	9.1	8.6		
pH s.u. Initial	8.4	8.4	8.4	8.4	8.5	8.5		
Conductivity µS Initial	1,416	1,392	1,441	1,460	1,497	1,487		
Temp °C Final	24.0	24.7	24.0	24.0	24.0	24.5		
D.O. mg/L Final	8.3	8.1	8.1	8.4	8.3	8.3		
pH s.u. Final	9.0	9.0	9.0	8.9	9.1	9.1		
Conductivity µS Final	1,468	1,495	1,503	1,573	1,537	1,559		
100%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.6	26.0	24.7					
D.O. mg/L Initial	9.1	8.8	8.9					
pH s.u. Initial	8.4	8.5	8.4					
Conductivity µS Initial	2,699	2,704	2,773					
Temp °C Final	24.0	24.9						
D.O. mg/L Final	8.3	8.0						
pH s.u. Final	9.1	9.1						
Conductivity µS Final	2,864	2,918						

Table of Random Permutations of 16

C.dubia Test ID# 19-39

7	12	15	15	1	2	7	16	10	2	14	15	7	13	13	10	6	1	8	10
13	3	8	16	7	10	11	10	13	5	11	7	13	16	7	7	5	13	2	14
3	1	4	5	14	13	3	14	9	13	13	2	9	15	6	2	8	4	5	8
11	8	16	14	15	6	2	6	2	16	8	5	12	3	9	13	4	3	10	4
14	9	1	6	3	9	14	13	8	6	5	8	14	7	3	15	13	11	4	7
2	16	10	13	5	5	13	2	11	7	3	12	5	14	12	16	2	2	9	15
4	6	13	7	2	15	1	9	1	4	7	10	6	9	11	9	7	6	16	11
6	14	6	10	4	14	4	15	3	3	4	16	2	6	5	1	12	10	6	9
10	15	2	1	13	12	16	3	4	8	10	1	15	5	14	12	14	12	3	2
12	10	7	12	9	11	9	8	12	14	15	4	11	8	16	8	9	14	14	1
15	7	5	2	10	7	8	12	6	15	6	13	16	12	15	4	11	8	12	6
16	2	11	8	8	8	15	5	16	1	1	9	8	1	8	14	16	5	13	5
9	13	14	3	6	4	10	11	5	12	9	3	10	4	4	3	10	9	1	3
8	11	9	4	11	3	12	7	7	10	12	14	3	10	1	6	15	16	15	12
1	5	12	11	16	16	5	4	14	9	16	11	1	2	10	5	1	15	7	13
5	4	3	9	12	1	6	1	15	11	2	6	4	11	2	11	3	7	11	16
																	CON(	REP	
11	8	16	5	5	13	1	13	2	16	14	12	9	8	7	5	13	3	13	3
2	2	8	8	14	16	4	3	8	11	10	14	15	1	2	11	4	5	15	9
6	13	2	13	6	5	9	15	11	10	12	6	16	15	16	9	10	12	16	15
14	12	4	16	16	11	14	10	5	12	3	3	12	14	15	13	6	4	1	16
8	6	3	9	4	10	6	4	16	2	2	9	8	16	4	6	5	15	7	8
9	15	12	10	3	2	12	6	1	15	4	13	7	7	9	12	14	8	8	11
3	10	11	12	13	12	5	11	7	8	9	5	14	11	10	1	3	13	3	5
16	1	13	14	8	14	15	5	3	7	11	15	6	12	5	7	11	1	14	4
1	14	14	2	9	15	16	14	6	14	7	8	3	13	11	8	7	7	12	7
4	4	6	4	12	3	11	8	15	9	8	1	13	6	3	3	15	9	9	12
15	5	1	11	10	6	3	7	10	5	5	11	10	10	12	15	16	14	5	2
5	3	5	6	7	7	13	2	14	3	16	4	5	5	13	4	9	16	2	6
12	7	15	15	15	9	8	12	12	13	15	10	1	4	6	16	2	6	11	1
10	11	10	3	2	4	2	1	4	6	6	7	11	9	14	10	8	11	4	13
7	9	7	7	11	1	7	16	13	1	13	2	4	2	1	2	12	2	10	14
13	16	9	1	1	8	10	9	9	4	1	16	2	3	8	14	1	10	6	10
1	6	7	4	8	6	5	2	8	15	4	6	6	1	4	5	7	13	2	10
9	15	11	3	11	15	9	10	1	3	8	2	15	7	9	8	16	1	14	3
10	16	4	5	12	9	16	11	7	1	7	16	11	8	3	3	12	2	3	4
4	14	1	9	5	5	4	13	6	8	15	5	12	5	7	16	5	11	8	1
7	3	13	14	15	2	1	14	16	5	14	9	2	16	1	12	6	14	4	13
16	11	2	1	14	16	6	9	3	4	16	14	3	15	11	11	3	9	12	5
3	10	16	16	13	7	13	1	11	14	9	10	16	2	10	2	10	7	10	16
11	13	9	13	4	13	8	3	5	13	10	12	5	12	5	14	13	16	5	6
15	2	3	12	9	12	2	4	13	10	3	13	14	4	2	1	14	8	6	12
14	1	14	6	10	1	3	12	4	2	2	4	13	3	16	9	9	3	7	14
13	12	5	11	3	11	15	8	2	7	11	7	8	14	6	4	4	4	15	11
12	5	10	7	2	14	7	15	14	16	13	1	9	10	12	10	11	10	9	8
8	9	8	10	6	4	11	7	10	11	6	8	4	9	8	15	8	6	11	9
2	7	6	2	1	8	10	6	15	12	1	11	7	11	13	6	1	15	13	15
6	4	15	8	16	10	14	16	9	6	12	3	10	6	14	7	2	12	16	7
5	8	12	15	7	3	12	5	12	9	5	15	1	13	15	13	15	5	1	2
13	4	10	4	16	13	16	13	5	3	6	14	1	16	8	7	2	3	3	12
5	14	4	6	8	2	15	1	13	14	16	4	15	4	3	12	12	1	4	7
2	2	2	15	14	16	9	12	16	6	10	15	14	9	10	1	14	8	8	16
7	12	15	8	12	3	5	14	7	12	5	13	16	1	7	5	11	2	9	3
6	9	7	14	9	14	10	11	15	11	12	1	12	12	14	16	3	11	11	8
14	5	16	7	10	8	11	8	14	13	7	11	6	3	11	4	4	6	6	9
15	11	8	9	7	12	8	7	1	15	9	3	3	7	13	11	10	4	5	1
11	6	6	1	4	1	3	16	12	5	4	9	13	13	6	8	15	9	1	14
4	10	3	16	2	11	7	9	6	9	1	8	4	11	5	2	16	10	12	4
1	8	1	13	1	15	4	4	11	4	2	16	5	8	1	9	5	12	16	6
9	7	14	2	6	4	14	10	9	8	15	10	7	10	9	10	6	14	10	11
12	1	9	10	15	5	2	15	10	2	14	2	8	2	4	13	8	5	15	5
3	3	12	11	5	9	6	6	3	10	13	12	9	6	2	15	7	15	7	13
10	15	11	5	13	7	12	5	2	7	11	5	10	15	12	3	1	13	13	10
8	13	13	3	3	10	13	2	4	1	8	6	11	14	15	6	9	16	2	2
16	16	5	12	11	6	1	3	8	16	3	7	2	5	16	14	13	7	14	15

Ceriodaphnia dubia Culture Chart Lot # Cd18(RMH 304) A

Brood mother source: 299 S A-1,2 Source's brood size: (Qty.) Bernhardt 1-7-19

Tech	AH	AH	AH	AH	AH		KF	AH									
Date	12-31	1-1	1-2	1-3	1-4		1-6	1-7									
Day acc.	0	1	2	3	4	5	6	7		8	9	10	11	12	13	14	
Cup # 1	N	N	N	N	4		7	Y	1								
2	N	N	N	N	4		8	T1 Y 15	2								
3	N	N	N	N	4		8	T2 Y 17	3								
4	N	N	N	N	5		9	T3 Y 16	4								
5	N	N	N	N	4		8	Y	5								
6	N	N	N	N	6		9	T4 Y 17	6								
7	N	N	N	N	5		24	N	7								
8	N	N	N	N	4		10	T5 Y 17	8								
9	N	N	N	N	4		10	T6 Y 15	9								
10	N	N	N	N	5		8	T7 Y 16	10								
11	N	N	N	N	4		10	Y	11								
12	N	N	N	N	6		9	T8 Y 15	12								
13	N	N	N	N	4		9	T9 Y 17	13								

Y = neonates present, and *criterion has been met:* ≥ 20 neonates produced in total by 3rd brood. **N** = no neonates

2B = two broods present. **2Y** = two broods and criterion met: ≥ 20 neos. by 3rd brood. **X** = brood mother dead **ae** = aborted eggs

✓ or **P** = neonates present after renewal on previous day (see time in log). **A→** = acceptable for acute testing only

T# = neonates used in test, replicate number of test noted (and brood counted). **acc.** = *if acclimated*, H_2O type used w/ renewal **this** day.

Test organism collection:

Project #	Symbols (✓ / P)	Tray diagram used? (Y/N)	Time period, neonates released	Collection date / time
00044654	T	Y	1-6-19/1230 → 1-6-19/1500	1-7-19/1200
	T			
	T			
	T			
	T			
	T			

Ceriodaphnia dubia Culture Chart

Lot # Cal8CRM11 304) B

Brood mother source: 2995 B-1,2 Source's brood size: 17 (Qty.)

Bernhardt 1-7-19

Tech	AH	AH	AH	AH	AH		KF	AH								
Date	12-31	1-1	1-2	1-3	1-4		1-6	1-7								
Day acc.	0	1	2	3	4	5	6	7		8	9	10	11	12	13	14
Cup # 1	N	N	N	N	4		8	T1 Y 17	1							
2	N	N	N	N	3		9	T2 Y 16	2							
3	N	N	N	N	4		8	T3 Y 15	3							
4	N	N	N	N	4		8	T4 Y 15	4							
5	N	N	N	N	2		9	T4 Y 15	5							
6	N	N	N	N	3		7	T5 Y 13	6							
7	N	N	N	N	3		7	T6 Y 15	7							
8	N	N	N	N	4		7	T7 Y 15	8							
9	N	N	N	N	2		6	T8 Y 14	9							
10	N	N	N	N	3		8	T9 Y 15	10							
11	N	N	N	N	3		6	T10 Y 15	11							
12	N	N	N	N	4		8	Y	12							
13	N	N	N	N	5		8	Y	13							

Y = neonates present, and *criterion has been met:* ≥ 20 neonates produced in total by 3rd brood. **N** = no neonates

2B = two broods present. **2Y** = two broods and criterion met: ≥ 20 neos. by 3rd brood. **X** = brood mother dead **ae** = aborted eggs

✓ or **P** = neonates present after renewal on previous day (see time in log). **A→** = acceptable for acute testing only

T# = neonates used in test, replicate number of test noted (and brood counted). **acc.** = *if acclimated*, H_2O type used w/ renewal **this** day.

Test organism collection:

Project #	Symbols (✓ / P)	Tray diagram used? (Y/N)	Time period, neonates released	Collection date / time
0044654	T	Y	1-6-19/1230 → 1-6-19/1500	1-7-19/1200
0044703	(T)	Y	1-6-19/1500 → 1-6-19/1900	1-7-19/1245
	T			
	T			
	T			
	T			

CHEMICAL ANALYSIS

Please note the subcontract laboratory has its own QAQC and data review processes, and therefore New England Bioassay does not review the analytical results we receive.

PHOENIX
Environmental Laboratories, Inc.

Friday, January 11, 2019

Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Project ID: BARNHARDT MFG
Sample ID#s: CC24285 - CC24287

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Telephone (860) 645-1102 Fax (860) 645-0823

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 11, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WASTE WATER	Collected by:		01/07/19	7:00
Location Code:	NEB	Received by:	SW	01/07/19	15:00
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC24285
Phoenix ID: CC24285

Project ID: BARNHARDT MFG
Client ID: EFFLUENT-1 C39-1008

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Aluminum	0.419	0.005	mg/L	1	01/09/19	TH	E200.7	B
Cadmium	0.0005	0.0001	mg/L	1	01/09/19	RS	SM3113B	
Copper	0.0316	0.0010	mg/L	1	01/09/19	TH	E200.7	
Hardness (CaCO3)	85.3	0.1	mg/L	1	01/09/19		E200.7	
Nickel	0.005	0.001	mg/L	1	01/09/19	TH	E200.7	
Lead	< 0.0003	0.0003	mg/L	1	01/09/19	RS	SM3113B	
Zinc	0.058	0.002	mg/L	1	01/09/19	TH	E200.7	
Alkalinity-CaCO3	1470	5.00	mg/L	1	01/08/19	RR/EG	SM2320B-11	
Conductivity	2460	5.00	umhos/cm	1	01/08/19	RR/EG	SM2510B-11	
Ammonia as Nitrogen	0.71	0.25	mg/L	5	01/09/19	KDB	E350.1	
Tot. Diss. Solids	1800	40	mg/L	4	01/09/19	MM/EG	SM2540C-11	
Tot. Org. Carbon	98.5	2.5	mg/L	5	01/08/19	RWR	SM5310B-11	
Total Solids	1800	50	mg/L	5	01/09/19	DA/EG	SM2540B-11	
Total Metals Digestion	Completed				01/08/19	AG		

Project ID: BARNHARDT MFG
Client ID: EFFLUENT-1 C39-1008

Phoenix I.D.: CC24285

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

B = Present in blank, no bias suspected.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

TOC Analysis:
This sample was received with a pH>2. The EPA requires preservation at time of sampling to a pH of <2. A sample bias can not be ruled out.

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
January 11, 2019
Reviewed and Released by: Kathleen Cressia, QA/QC Officer

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 11, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WASTE WATER	Collected by:		01/07/19	7:30
Location Code:	NEB	Received by:	SW	01/07/19	15:00
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC24285
Phoenix ID: CC24286

Project ID: BARNHARDT MFG
Client ID: RECEIVING WATER-1 C39-1009

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Aluminum	0.361	0.005	mg/L	1	01/09/19	TH	E200.7	B
Cadmium	< 0.0001	0.0001	mg/L	1	01/09/19	RS	SM3113B	
Copper	0.0011	0.0010	mg/L	1	01/09/19	TH	E200.7	
Hardness (CaCO3)	26.8	0.1	mg/L	1	01/09/19		E200.7	
Nickel	< 0.001	0.001	mg/L	1	01/09/19	TH	E200.7	
Lead	< 0.0003	0.0003	mg/L	1	01/08/19	RS	SM3113B	
Zinc	0.002	0.002	mg/L	1	01/09/19	TH	E200.7	
Alkalinity-CaCO3	31.1	5.00	mg/L	1	01/08/19	RR/EG	SM2320B-11	
Conductivity	80	5.00	umhos/cm	1	01/08/19	RR/EG	SM2510B-11	
Ammonia as Nitrogen	< 0.05	0.05	mg/L	1	01/09/19	KDB	E350.1	
pH	7.27	1.00	pH Units	1	01/08/19 01:34	RR/EG	SM4500-H B-11	
Tot. Org. Carbon	1.84	0.50	mg/L	1	01/08/19	RWR	SM5310B-11	
Total Metals Digestion	Completed				01/08/19	AG		

Project ID: BARNHARDT MFG
Client ID: RECEIVING WATER-1 C39-1009

Phoenix I.D.: CC24286

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

B = Present in blank, no bias suspected.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
January 11, 2019
Reviewed and Released by: Kathleen Cressia, QA/QC Officer

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 11, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WASTE WATER	Collected by:		01/07/19	7:00
Location Code:	NEB	Received by:	SW	01/07/19	15:00
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC24285
Phoenix ID: CC24287

Project ID: BARNHARDT MFG
Client ID: EFFLUENT GRAB-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Chlorine Residual	< 0.02	0.02	mg/L	1	01/07/19 19:30	O	SM4500CLG-97
pH	8.60	1.00	pH Units	1	01/08/19 01:36	RR/EG	SM4500-H B-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The regulatory hold time for Chlorine is immediately. This Chlorine was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services.

Phyllis Shiller, Laboratory Director
January 11, 2019
Reviewed and Released by: Kathleen Cressia, QA/QC Officer

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

January 11, 2019

QA/QC Data

SDG I.D.: GCC24285

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 462383 (mg/L), QC Sample No: CC24276 (CC24285, CC24286)													
Cadmium - Water	BRL	0.0001	<0.0002	<0.0002	NC	111			102			75 - 125	20
QA/QC Batch 462547 (mg/L), QC Sample No: CC24285 (CC24285)													
Cadmium - Water	BRL	0.0001	0.0005	0.0004	NC	109			112			75 - 125	20
QA/QC Batch 462383 (mg/L), QC Sample No: CC24276 (CC24285, CC24286)													
Lead (Furnace) - Water	BRL	0.001	<0.0010	<0.002	NC	97.6			92.9			75 - 125	30
QA/QC Batch 462514 (mg/L), QC Sample No: CC24212 (CC24285, CC24286)													
ICP Metals - Aqueous													
Aluminum	0.0050	0.0050	0.033	0.0313	5.30	108			114			75 - 125	20
Copper	BRL	0.0025	0.005	0.0052	NC	102			107			75 - 125	20
Nickel	BRL	0.0005	0.006	0.0060	0	107			105			75 - 125	20
Zinc	BRL	0.0020	0.036	0.0352	2.20	106			108			75 - 125	20

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

January 11, 2019

QA/QC Data

SDG I.D.: GCC24285

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 462510 (mg/L), QC Sample No: CC22596 (CC24285, CC24286)													
Total Organic Carbon	BRL	1.0				98.0			99.0			85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462471 (umhos/cm), QC Sample No: CC24066 (CC24285, CC24286)													
Conductivity	BRL	5.00	284	281	1.10	96.7						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462457 (pH), QC Sample No: CC24066 (CC24286, CC24287)													
pH			6.56	6.53	0.50	97.3						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462433 (mg/L), QC Sample No: CC24209 (CC24285)													
Total Solids	BRL	10	58	63	8.30	99.0						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462611 (mg/L), QC Sample No: CC24300 (CC24285)													
Tot. Diss. Solids	BRL	10	1900	1900	0	100						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462463 (mg/L), QC Sample No: CC24378 (CC24285, CC24286)													
Alkalinity-CaCO3	BRL	5.00	87	89	NC	102						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462430 (mg/L), QC Sample No: CC24030 (CC24285, CC24286)													
Ammonia as Nitrogen	BRL	0.05	0.06	0.06	NC	100			97.2			90 - 110	20
QA/QC Batch 462403 (mg/L), QC Sample No: CC24208 (CC24287)													
Chlorine Residual	BRL	0.02	<0.02	<0.02	NC	98.9							

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
January 11, 2019

Friday, January 11, 2019

Criteria: None

State: MA

Sample Criteria Exceedances Report

GCC24285 - NEB

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibllity to determine appropriate compliance.

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac
NY # 11301

Analysis Comments

January 11, 2019 SDG I.D.: GCC24285

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WC DPH

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: service@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 4.3 Pg of

Data Delivery (check one):
☐ Fax #:
☒ Email: kimberly.wills@gza.com
Format: ☐ Excel ☐ Pdf ☐ Gis Key

Customer: New England Bioassay
Address: 77 Batson Drive
Manchester, CT 06042

Project: Bainbridt Mfg (MA)
Report to: Kim Wills
Invoice to: Kim Wills

Project P.O: 22393
Phone #: 860-643-9560
Fax #: 860-646-7169

Client Sample - Information - Identification

Sampler's Signature _____ Date _____

Matrix Code:
DW=drinking water WW=wastewater S=soil/solid O=other
GW=groundwater SL=sludge A=air

Analysis Request

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Hardness (0.5 mg/L)	Alkalinity (2.0 mg/L)	Specific Conductance (–)	Total Solids (–)	Total Dissolved Solids (–)	Ammonia (0.1 mg/L)	Total Organic Carbon (0.5 mg/L)	Cd (AA), Pb (AA), Cu, Zn, Ni, Al	Total Residual Chlorine (0.02 mg/L)	pH (–)	Soil VOA Vials [ ] methanol [ ] Sod Bisulfate	GL Soil container ( ) oz	PL As is 250 ml	PL 120ml As is	GL Amber 120ml [ ] As is [X] 8oz.	PL As is [X] 500ml [ ] As is [X] ~~Hcl~~ H3PO4	PL H2SO4 [X] 250ml [ ] 1000ml	PL HNO3 [X] 250ml [ ] 1000ml	PL NaOH 250ml	Bacteria Bottle
24285	Effluent-1 C39-1008	WW	1/6-1/7/19	0700-0700	X	X	X	X	X	X	X	X							1	1	1	1		
24286	Receiving Water-1 C39-1009	O	1/7/19	0730	X	X	X			X	X	X		X					1	1	1	1		
24287	Effluent grab-1	WW	1/7/19	0700									X	X			1							

Relinquished by:	Accepted by:	Date:	Time:
[signature]	[signature]	1-7-19	1430
[signature]	[signature]	1-7-19	1500

Comments, Special Requirements or Regulations:

Please see detection limits (MLs) listed next to each parameter above. Metals MLs are listed below:

Cd - 0.0005 mg/L; Pb - 0.0005 mg/L; Cu - 0.003 mg/L; Zn - 0.005 mg/L; Ni - 0.005 mg/L; Al - 0.02 mg/L

Please CC: Melanie.Cruff@gza.com and Robin.Faulk@gza.com on reports

Turnaround:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☒ Standard
☐ Other

* Surcharge Applies

Requirements for CT
☐ Res. Criteria
☐ GW Protection
☐ GA Mobility
☐ GB Mobility
☐ SW Protection
☐ Res. Vol.
☐ Ind. Vol.

Requirements for MA
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ MCP Certification
☐ Other

PHOENIX
Environmental Laboratories, Inc.

Tuesday, January 15, 2019

Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Project ID: BARNHARDT MFG MA
Sample ID#s: CC26461 - CC26463

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Telephone (860) 645-1102 Fax (860) 645-0823

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 15, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WASTE WATER	Collected by:		01/09/19	7:00
Location Code:	NEB	Received by:	B	01/09/19	16:06
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC26461
Phoenix ID: CC26461

Project ID: BARNHARDT MFG MA
Client ID: EFFLUENT 2 C39-1051

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Aluminum	0.077	0.005	mg/L	1	01/12/19	CPP	E200.7
Cadmium	0.0005	0.0001	mg/L	1	01/11/19	RS	SM3113B
Copper	0.0320	0.0010	mg/L	1	01/12/19	CPP	E200.7
Hardness (CaCO3)	88.8	0.1	mg/L	1	01/13/19		E200.7
Nickel	0.005	0.001	mg/L	1	01/12/19	CPP	E200.7
Lead	< 0.0003	0.0003	mg/L	1	01/11/19	RS	SM3113B
Zinc	0.064	0.002	mg/L	1	01/12/19	CPP	E200.7
Alkalinity-CaCO3	1560	5.00	mg/L	1	01/10/19	RR/EG	SM2320B-11
Conductivity	2630	5.00	umhos/cm	1	01/10/19	RR/EG	SM2510B-11
Ammonia as Nitrogen	0.61	0.10	mg/L	2	01/12/19	KDB	E350.1
Tot. Diss. Solids	1900	67	mg/L	6.7	01/12/19	DA	SM2540C-11
Tot. Org. Carbon	110	5.0	mg/L	10	01/11/19	RWR	SM5310B-11
Total Solids	1900	100	mg/L	10	01/12/19	DA	SM2540B-11
Total Metals Digestion	Completed				01/11/19	AG	

Project ID: BARNHARDT MFG MA
Client ID: EFFLUENT 2 C39-1051

Phoenix I.D.: CC26461

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

TOC Analysis:
This sample was received with a pH>2. The EPA requires preservation at time of sampling to a pH of <2. A sample bias can not be ruled out.

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
January 15, 2019
Reviewed and Released by: Greg Lawrence, Assistant Lab Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 15, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WATER	Collected by:		01/09/19	7:30
Location Code:	NEB	Received by:	B	01/09/19	16:06
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC26461
Phoenix ID: CC26462

Project ID: BARNHARDT MFG MA
Client ID: RIVER C39-1052

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Aluminum	0.127	0.010	mg/L	1	01/11/19	EK	SW6010D/E200.7
Cadmium	< 0.0001	0.0001	mg/L	1	01/11/19	RS	SM3113B/SW7010-10
Copper	< 0.0020	0.0020	mg/L	1	01/11/19	EK	SW6010D/E200.7
Hardness (CaCO3)	21.3	0.1	mg/L	1	01/11/19		E200.7
Nickel	< 0.001	0.001	mg/L	1	01/11/19	EK	SW6010D/E200.7
Lead	< 0.0003	0.0003	mg/L	1	01/11/19	RS	SM3113B/SW7010
Zinc	< 0.004	0.004	mg/L	1	01/11/19	EK	SW6010D/E200.7
Alkalinity-CaCO3	29.7	5.00	mg/L	1	01/10/19	RR/EG	SM2320B-11
Conductivity	89	5.00	umhos/cm	1	01/10/19	RR/EG	SM2510B-11
Ammonia as Nitrogen	< 0.05	0.05	mg/L	1	01/12/19	KDB	E350.1
pH	7.24	1.00	pH Units	1	01/10/19 05:14	RR/EG	SM4500-H B-11
Tot. Org. Carbon	1.41	0.50	mg/L	1	01/11/19	RWR	SM5310B-11
Total Metals Digestion	Completed				01/10/19	AG	

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
January 15, 2019
Reviewed and Released by: Greg Lawrence, Assistant Lab Director

Ver 1

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 15, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WASTE WATER	Collected by:		01/09/19	7:00
Location Code:	NEB	Received by:	B	01/09/19	16:06
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC26461
Phoenix ID: CC26463

Project ID: BARNHARDT MFG MA
Client ID: EFFLUENT GRAB

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Chlorine Residual	< 0.02	0.02	mg/L	1	01/09/19 20:14	O	SM4500CLG-97
pH	8.58	1.00	pH Units	1	01/10/19 05:16	RR/EG	SM4500-H B-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The regulatory hold time for Chlorine is immediately. This Chlorine was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services.

Phyllis Shiller, Laboratory Director
January 15, 2019
Reviewed and Released by: Greg Lawrence, Assistant Lab Director

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

January 15, 2019

QA/QC Data

SDG I.D.: GCC26461

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 462547 (mg/L), QC Sample No: CC24285 (CC26461, CC26462)													
Cadmium - Water	BRL	0.0001	0.0005	0.0004	NC	109			112			75 - 125	20
QA/QC Batch 462879 (mg/L), QC Sample No: CC25859 (CC26461, CC26462)													
Lead (Furnace) - Water	BRL	0.001	0.0017	0.002	NC	109			97.9			75 - 125	30
QA/QC Batch 462903 (mg/L), QC Sample No: CC25688 (CC26462)													
ICP Metals - Aqueous													
Aluminum	BRL	0.010	0.121	0.101	18.0	97.6			103			75 - 125	20
Copper	BRL	0.005	0.063	0.056	11.8	99.2			100			75 - 125	20
Nickel	BRL	0.001	0.004	0.003	NC	95.9			92.5			75 - 125	20
Zinc	BRL	0.004	0.014	0.014	NC	95.8			95.0			75 - 125	20
QA/QC Batch 463096 (mg/L), QC Sample No: CC26652 (CC26461)													
ICP Metals - Aqueous													
Aluminum	BRL	0.0050	0.038	0.0392	3.10	105			112			75 - 125	20
Copper	BRL	0.0025	0.018	0.0184	2.20	105			108			75 - 125	20
Nickel	BRL	0.0005	0.003	0.0029	NC	108			101			75 - 125	20
Zinc	BRL	0.0020	0.012	0.0120	0	108			106			75 - 125	20

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Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

January 15, 2019

QA/QC Data

SDG I.D.: GCC26461

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 462817 (mg/L), QC Sample No: CC26321 (CC26461, CC26462)													
Alkalinity-CaCO3	BRL	5.00	22	24	NC	110						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462827 (umhos/cm), QC Sample No: CC26321 (CC26461, CC26462)													
Conductivity	BRL	5.00	36	37.9	5.10	96.7						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 462811 (pH), QC Sample No: CC26321 (CC26462, CC26463)													
pH			7.07	7.34	3.70	97.4						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463139 (mg/L), QC Sample No: CC26437 (CC26461)													
Tot. Diss. Solids	BRL	10	44	38	NC	101						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463140 (mg/L), QC Sample No: CC26458 (CC26461)													
Total Solids	BRL	10	670	640	4.60	98.0						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463275 (mg/L), QC Sample No: CC27262 (CC26461, CC26462)													
Total Organic Carbon	BRL	1.0	<1.0	<1.0	NC	99.0			101			85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463011 (mg/L), QC Sample No: CC26449 (CC26461, CC26462)													
Ammonia as Nitrogen	BRL	0.05	<0.10	<0.10	NC	105			95.0			90 - 110	20
QA/QC Batch 462742 (mg/L), QC Sample No: CC25657 (CC26463)													
Chlorine Residual	BRL	0.02	<0.02	<0.02	NC	105							

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
January 15, 2019

Tuesday, January 15, 2019

Criteria: None

State: MA

Sample Criteria Exceedances Report

GCC26461 - NEB

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac
NY # 11301

Analysis Comments

January 15, 2019 SDG I.D.: GCC26461

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: service@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 3.0 Pg of

Data Delivery (check one):
☐ Fax #:
☒ Email: kimberly.wills@gza.com WCFP
Format: ☐ Excel ☐ Pdf ☐ Gis Key

Customer: New England Bioassay
Address: 77 Batson Drive
Manchester, CT 06042

Project: Barnhardt Mfg (MA)
Report to: Kim Wills
Invoice to: Kim Wills

Project P.O: 22393
Phone #: 860-643-9560
Fax #: 860-646-7169

Client Sample - Information - Identification

Sampler's Signature _____ Date _____

Matrix Code:
DW=drinking water **WW**=wastewater **S**=soil/solid **O**=other
GW=groundwater **SL**=sludge **A**=air

Analysis Request

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Hardness	Alkalinity	Specific Conductance	Total Solids	Total Dissolved Solids	Ammonia	TOC	Cd, Pb, Cu, Zn, Ni, Al	pH	Total Residual Chlorine	Soil VOA Vials [ ] methanol [ ] Sod Bisulfate	GL Soil container ( ) oz	GL Soil container ( ) oz	40 ml VOA Vial 5-10 As is [ ] HCl	GL Amber 120ml [ ] As is [X] ~~H2SO4~~ H3PO4	PL As is [X] 250ml [ ] As is [X] 500ml [ ] 1000ml	PL H2SO4 [X] 250ml [ ] 250ml [ ] 1000ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle
260461	Effluent - 2	WW	1-8-19 - 1-9-19	0700 - 0700	x	x	x	x	x	x	x	x						1	1	1	1			
260462	River - 2	O	1-9-19	0730	x	x	x			x	x	x	x					1	1	1	1			
260463	Effluent Grab - 2	WW	1-9-19	0700									x	x					1					
	Eff - C39-1051																							
	Riv - C39-1052																							

Relinquished by:	Accepted by:	Date:	Time:
		1-9-19	1505
		1-9-19	
		1/9/19	1600

Comments, Special Requirements or Regulations:

CC melanie.cruff@gza.com and robin.faulk@gza.com
Cd- 0.0005 mg/L; Pb-0.0005 mg/L; Cu-0.003 mg/L; Zn-0.005 mg/L
Ni-0.005 mg/L; Al - 0.02 mg/L

Turnaround:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☒ Standard
☐ Other

* Surcharge Applies

Requirements for CT
☐ Res. Criteria
☐ GW Protection
☐ GA Mobility
☐ GB Mobility
☐ SW Protection
☐ Res. Vol.
☐ Ind. Vol.

Requirements for MA
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ MCP Certification
☐ Other

PHOENIX
Environmental Laboratories, Inc.

Friday, January 18, 2019

Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Project ID: BARNHARDT MFG
SDG ID: GCC27856
Sample ID#s: CC27856 - CC27858

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Telephone (860) 645-1102 Fax (860) 645-0823

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

January 18, 2019

SDG I.D.: GCC27856

Project ID: BARNHARDT MFG

Client Id	Lab Id	Matrix
EFFLUENT-3 C39-1101	CC27856	WASTE WATER
RECEIVING WATER-3 C39-1102	CC27857	SURFACE WATER
EFFLUENT GRAB 3	CC27858	WASTE WATER

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 18, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WASTE WATER	Collected by:		01/11/19	7:00
Location Code:	NEB	Received by:	CP	01/11/19	15:16
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC27856
Phoenix ID: CC27856

Project ID: BARNHARDT MFG
Client ID: EFFLUENT-3 C39-1101

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Aluminum	0.075	0.005	mg/L	1	01/15/19	TH	E200.7
Cadmium	0.0005	0.0001	mg/L	1	01/15/19	RS	SM3113B
Copper	0.0324	0.0010	mg/L	1	01/15/19	TH	E200.7
Hardness (CaCO3)	88.5	0.1	mg/L	1	01/15/19		E200.7
Nickel	0.005	0.001	mg/L	1	01/15/19	TH	E200.7
Lead	< 0.0003	0.0003	mg/L	1	01/15/19	RS	SM3113B
Zinc	0.063	0.002	mg/L	1	01/15/19	TH	E200.7
Alkalinity-CaCO3	1600	5.00	mg/L	1	01/12/19	RR/EG	SM2320B-11
Ammonia as Nitrogen	< 1.00	1.00	mg/L	20	01/15/19	KDB	E350.1
Tot. Diss. Solids	2100	40	mg/L	4	01/15/19	MM/DA	SM2540C-11
Tot. Org. Carbon	97.3	5.0	mg/L	10	01/15/19	RWR	SM5310B-11
Total Solids	2100	100	mg/L	10	01/12/19	DA	SM2540B-11
Total Metals Digestion	Completed				01/14/19	AG	

Project ID: BARNHARDT MFG
Client ID: EFFLUENT-3 C39-1101

Phoenix I.D.: CC27856

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

TOC Analysis:
This sample was received with a pH>2. The EPA requires preservation at time of sampling to a pH of <2. A sample bias can not be ruled out.

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
January 18, 2019
Reviewed and Released by: Greg Lawrence, Assistant Lab Director

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 18, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		01/11/19	7:30
Location Code:	NEB	Received by:	CP	01/11/19	15:16
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC27856
Phoenix ID: CC27857

Project ID: BARNHARDT MFG
Client ID: RECEIVING WATER-3 C39-1102

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Aluminum	0.051	0.010	mg/L	1	01/15/19	TH	SW6010D
Cadmium	< 0.0001	0.0001	mg/L	1	01/15/19	RS	SM3113B/SW7010-10
Copper	< 0.0020	0.0020	mg/L	1	01/15/19	TH	SW6010D
Hardness (CaCO3)	25.9	0.1	mg/L	1	01/15/19		E200.7
Nickel	< 0.001	0.001	mg/L	1	01/15/19	TH	SW6010D
Lead	< 0.0003	0.0003	mg/L	1	01/15/19	RS	SM3113B/SW7010-10
Zinc	< 0.004	0.004	mg/L	1	01/15/19	TH	SW6010D
Alkalinity-CaCO3	29.6	5.00	mg/L	1	01/12/19	RR/EG	SM2320B-11
Ammonia as Nitrogen	< 0.05	0.05	mg/L	1	01/15/19	KDB	E350.1
pH	7.18	1.00	pH Units	1	01/12/19 01:53	RR/EG	SM4500-H B-11
Tot. Org. Carbon	1.7	0.50	mg/L	1	01/15/19	RWR	SM5310B-11
Total Metals Digestion	Completed				01/14/19	AG	

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
January 18, 2019
Reviewed and Released by: Greg Lawrence, Assistant Lab Director

Ver 1

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 18, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	WASTE WATER	Collected by:		01/11/19	7:00
Location Code:	NEB	Received by:	CP	01/11/19	15:16
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	22393				

Laboratory Data

SDG ID: GCC27856
Phoenix ID: CC27858

Project ID: BARNHARDT MFG
Client ID: EFFLUENT GRAB 3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Chlorine Residual	< 0.02	0.02	mg/L	1	01/11/19 19:18	O	SM4500CLG-97
pH	8.60	1.00	pH Units	1	01/12/19 01:55	RR/EG	SM4500-H B-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The regulatory hold time for Chlorine is immediately. This Chlorine was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services.

Phyllis Shiller, Laboratory Director
January 18, 2019
Reviewed and Released by: Greg Lawrence, Assistant Lab Director

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

January 18, 2019

QA/QC Data

SDG I.D.: GCC27856

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 463105 (mg/L), QC Sample No: CC28158 (CC27856, CC27857)													
Cadmium - Water	BRL	0.0001	0.0001	0.0001	NC	108			107			75 - 125	20
QA/QC Batch 463257 (mg/L), QC Sample No: CC27857 (CC27856, CC27857)													
Lead (Furnace) - Water	BRL	0.001	<0.0003	<0.001	NC	110			105			75 - 125	30
QA/QC Batch 463261 (mg/L), QC Sample No: CC27653 (CC27857)													
ICP Metals - Aqueous													
Aluminum	BRL	0.010	0.049	0.050	NC	99.9			99.0			75 - 125	20
Copper	BRL	0.005	0.035	0.034	2.90	103			103			75 - 125	20
Nickel	BRL	0.001	<0.001	<0.001	NC	103			104			75 - 125	20
Zinc	BRL	0.004	0.017	0.017	NC	100			101			75 - 125	20
QA/QC Batch 463259 (mg/L), QC Sample No: CC27785 (CC27856)													
ICP Metals - Aqueous													
Aluminum	BRL	0.0050	0.533	0.556	4.20	97.0			106			75 - 125	20
Copper	BRL	0.0025	0.765	0.795	3.80	96.7			100			75 - 125	20
Nickel	BRL	0.0005	0.005	0.0057	13.1	102			103			75 - 125	20
Zinc	BRL	0.0020	0.172	0.178	3.40	100			102			75 - 125	20

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Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

January 18, 2019

QA/QC Data

SDG I.D.: GCC27856

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 463140 (mg/L), QC Sample No: CC26458 (CC27856)													
Total Solids	BRL	10	670	640	4.60	98.0						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463184 (mg/L), QC Sample No: CC27814 (CC27856, CC27857)													
Alkalinity-CaCO3	BRL	5.00	44	47	NC	104						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463179 (pH), QC Sample No: CC27814 (CC27857, CC27858)													
pH			6.79	6.80	0.10	97.0						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463338 (mg/L), QC Sample No: CC27856 (CC27856)													
Tot. Diss. Solids	BRL	10	2100	2000	4.90	105						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463619 (mg/L), QC Sample No: CC29528 (CC27856)													
Total Organic Carbon	BRL	1.0	2.5	2.4	NC	104			92.0			85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 463165 (mg/L), QC Sample No: CC27004 (CC27856)													
Ammonia as Nitrogen	BRL	0.05	<0.10	<0.10	NC	95.2			90.5			90 - 110	20
QA/QC Batch 463263 (mg/L), QC Sample No: CC27519 (CC27857)													
Ammonia as Nitrogen	BRL	0.05	5.41	5.32	1.70	98.1			104			90 - 110	20
Comment:													
TKN is reported as Organic Nitrogen in the Blank, LCS, DUP and MS.													
QA/QC Batch 463115 (mg/L), QC Sample No: CC27486 (CC27858)													
Chlorine Residual	BRL	0.02	0.39	0.40	2.50	106							

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
January 18, 2019

Friday, January 18, 2019

Criteria: None

State: MA

Sample Criteria Exceedances Report

GCC27856 - NEB

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac
NY # 11301

Analysis Comments

January 18, 2019 SDG I.D.: GCC27856

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WCP

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: service@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 2.1 Pg of

Data Delivery (check one):
☐ Fax #:
☒ Email: kimberly.wills@gza.com
Format: ☐ Excel ☐ Pdf ☐ Gis Key

Customer: New England Bioassay
Address: 77 Batson Drive
Manchester, CT 06042

Project: Bainbridt Mfg (MA)
Report to: Kim Wills
Invoice to: Kim Wills

Project P.O: 22393
Phone #: 860-643-9560
Fax #: 860-646-7169

Client Sample - Information - Identification

Sampler's Signature _____ Date _____

Matrix Code:
DW=drinking water WW=wastewater S=soil/solid O=other
GW=groundwater SL=sludge A=air

Analysis Request

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Ammonia (0.1 mg/L)	pH (–)	Total Residual Chlorine (0.02 mg/L)	Hardness	Alkalinity	Total solids	Total dissolved solids	TOC	Cd (AA), Pb (AA), Cu, Zn, Ni, Al	Soil VOA Vials [ ] methanol [ ] Sod Bisulfate	GL Soil container ( ) oz	PL As Is 250 ml	PL As Is 120ml	GL Amber 250ml [ ] As is [ ] H2SO4	PL As is 1000ml [ ] As is [ ] H2SO4	PL H2SO4 [X] 250ml [ ] 1000ml	PL HNO3 [ ] 250ml [ ] 1000ml	PL NaOH 250ml	Bacteria Bottle
27855B	Effluent-3 C39-1101	WW	1/10-11/19	0700-0700	X			X	X	X	X	X	X	X					1	1	1	1	
27856	Receiving Water-3 C39-1102	O	1/11/19	0730	X	X		X	X			X	X	X					1	1	1	1	
27855B	Effluent Grab - 3	WW	1/11/19	0700		X	X								1								

Relinquished by:	Accepted by:	Date:	Time:
		1-11-19	1500
		1-11-19	15:16

Comments, Special Requirements or Regulations:

Please see detection limits (MLs) listed next to each parameter above
Cd – 0.0005 mg/L; Pb – 0.0005 mg/L; Cu – 0.003 mg/L
Zn – 0.005 mg/L; Ni – 0.005 mg/L; Al – 0.02 mg/L
Please CC: Melanie.Cruff@gza.com and Robin.Faulk@gza.com on reports

Turnaround:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☒ Standard
☐ Other

* Surcharge Applies

Requirements for CT
☐ Res. Criteria
☐ GW Protection
☐ GA Mobility
☐ GB Mobility
☐ SW Protection
☐ Res. Vol.
☐ Ind. Vol.

Requirements for MA
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ MCP Certification
☐ Other

SAMPLE RECEIPT CHEMISTRY
&
CHAIN OF CUSTODY DOCUMENTS

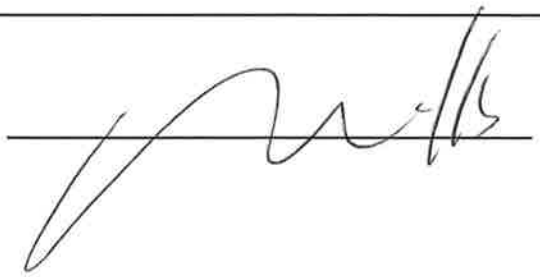
NEW ENGLAND BIOASSAY - INITIAL CHEMISTRY DATA

PERMITTEE: Barnhardt Manufacturing Co.

NEB JOB # 05.0044654.00

DATE RECEIVED	1/7/19		1/9/19		1/11/19	
SAMPLE TYPE:	EFF #1	RIVER #1	EFF #2	RIVER #2	EFF #3	RIVER #3
COC #	C39-1008	C39-1009	C39-1051	C39-1052	C39-1101	C39-1102
pH (SU)	8.3	7.2	8.3	6.9	8.3	7.3
Temperature (°C)	7.3	1.2	7.1	4.5	11.0	4.2
Dissolved Oxygen (mg/L)	10.1	13.4	9.0	10.9	9.0	12.4
Conductivity (µmhos)	2,695	75	2,818	100	2,896	84
Salinity (ppt)	1	<1	2	<1	2	<1
TRC - DPD (mg/L)	<0.001	0.005	<0.001	0.001	<0.001	0.009
TRC - Amperometric (mg/L)	NA	NA	NA	NA	NA	NA
Hardness (mg/L as $CaCO_3$)	72	26	84	26	82	28
Alkalinity (mg/l as $CaCO_3$)	1,345	25	1,385	30	1,405	25
Tech Initials	CH	CH	TBP	TBP	PD	PD

NOTE: NA = NOT APPLICABLE

Data Reviewed By: 

Date Reviewed: 1/22/19

NEW ENGLAND BIOASSAY - CHAIN-OF-CUSTODY

Sample Set #1

EFFLUENT

Sampler: Keith Cranmell
Title: WWTP operator
Facility: Barnhardt Manufacturing

Sampling Method: X **Composite**
Sample ID: Effluent
Start Date: 1-6-19 Time: 7Am
End Date: 1-7-19 Time: 7Am

Sampling Method: X **Grab** (for pH and TRC only X)
Date Collected: 1-7-19
Time Collected: 7Am

Sample Type:
____ Prechlorinated
____ Dechlorinated
____ Unchlorinated
____ Chlorinated

RECEIVING WATER

Sampler: Keith Cranmell
Title: WWTP operator
Facility: Barnhardt Manufacturing

Sampling Method: X Grab
Sample ID: North River
Date Collected: 1-7-19
Time Collected: 7:30Am

Effluent Sampling Location and Procedures: Composite sampler by flow - effluent

Receiving Water Sampling Location and Procedures: North river above outfall

Requested Analysis: X Chronic and modified acute

Sample Shipment

Method of Shipment: NEB Courier

Relinquished By:	Date: 1-7-19	Time: 0745
Received By:	Date: 1-7-19	Time: 0745
Relinquished By:	Date: 1-7-19	Time: 1110
Received By:	Date: 1/7/19	Time: 1110

Optional Information

Purchase Order # to reference on invoice: _____

Received
ON ICE

FOR NEB USE ONLY

*** Please return all ice packs NEB has provided to insure accurate temperature upon receipt to the NEB laboratory.**

Temperature of Effluent Upon Receipt at Lab: 7.3 °C
Temperature of Receiving Water Upon Receipt at Lab: 1.2 °C

Effluent COC# C39-1008
Receiving Water COC# C39-1009

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO:
KIM WILLS, NEW ENGLAND BIOASSAY 77 BATSON DRIVE MANCHESTER, CT 06042

NEW ENGLAND BIOASSAY - CHAIN-OF-CUSTODY

Sample Set # 2

EFFLUENT

Sampler: Keith Cammell
Title: WWTP operator
Facility: Barnhardt Manufacturing

Sampling Method: X **Composite**
Sample ID: Effluent
Start Date: 1-8-19 Time: 7am
End Date: 1-9-19 Time: 7AM

Sampling Method: X **Grab** (for pH and TRC only X)
Date Collected: 1-9-19
Time Collected: 7am

Sample Type:
____ Prechlorinated
____ Dechlorinated
____ Unchlorinated
____ Chlorinated

RECEIVING WATER

Sampler: Keith Cammell
Title: WWTP operator
Facility: Barnhardt Manufacturing

Sampling Method: X Grab
Sample ID: North River
Date Collected: 1-9-19
Time Collected: 7:30

Received
ON ICE

Effluent Sampling Location and Procedures: Composite sampler by flow - Effluent

Receiving Water Sampling Location and Procedures: North river above outfall

Requested Analysis: X Chronic and modified acute

Sample Shipment

Method of Shipment: NEB Courier

Relinquished By:	←	Date: 1-9-19	Time: 0733
Received By:	Chris Ran	Date: 1-9-19	Time: 0733
Relinquished By:	Robin Faulk	Date: 1-9-19	Time: 1130
Received By:	Joy for Barnhardt	Date: 1-9-19	Time: 1130

Optional Information

Purchase Order # to reference on invoice: _____

FOR NEB USE ONLY

*** Please return all ice packs NEB has provided to insure accurate temperature upon receipt to the NEB laboratory.**

Temperature of Effluent Upon Receipt at Lab: 7.1 °C
Temperature of Receiving Water Upon Receipt at Lab: 4.5 °C

Effluent COC# C39-1051
Receiving Water COC# C39-1052

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO:
KIM WILLS, NEW ENGLAND BIOASSAY 77 BATSON DRIVE MANCHESTER, CT 06042

NEW ENGLAND BIOASSAY - CHAIN-OF-CUSTODY

Sample Set #3

EFFLUENT

Sampler: Keith Gammell
Title: WWTP operator
Facility: Barnhardt Manufacturing

Sampling Method: X **Composite**
Sample ID: Effluent
Start Date: 1-10-19 Time: 7AM
End Date: 1-11-19 Time: 7AM

Sampling Method: X **Grab** (for pH and TRC only X)
Date Collected: 1-11-19
Time Collected: 7AM

Sample Type:
_____ Prechlorinated
_____ Dechlorinated
_____ Unchlorinated
_____ Chlorinated

RECEIVING WATER

Sampler: Keith Gammell
Title: WWTP operator
Facility: Barnhardt Manufacturing

Sampling Method: X Grab
Sample ID: North River
Date Collected: 1-11-19
Time Collected: 7:30

Received
ON ICE

Effluent Sampling Location and Procedures: Composite sampler by flow - effluent

Receiving Water Sampling Location and Procedures: North River above outfall

Requested Analysis: X Chronic and modified acute

Sample Shipment

Method of Shipment: NEB Courier

Relinquished By:		Date: 1-11-19	Time: 0740
Received By:		Date: 1-11-19	Time: 0740
Relinquished By:		Date: 1/11/19	Time: 1045
Received By:		Date: 1/11/19	Time: 1050

Optional Information

Purchase Order # to reference on invoice: _____

FOR NEB USE ONLY

*** Please return all ice packs NEB has provided to insure accurate temperature upon receipt to the NEB laboratory.**

Temperature of Effluent Upon Receipt at Lab: 11.0 °C
Temperature of Receiving Water Upon Receipt at Lab: 4.2 °C

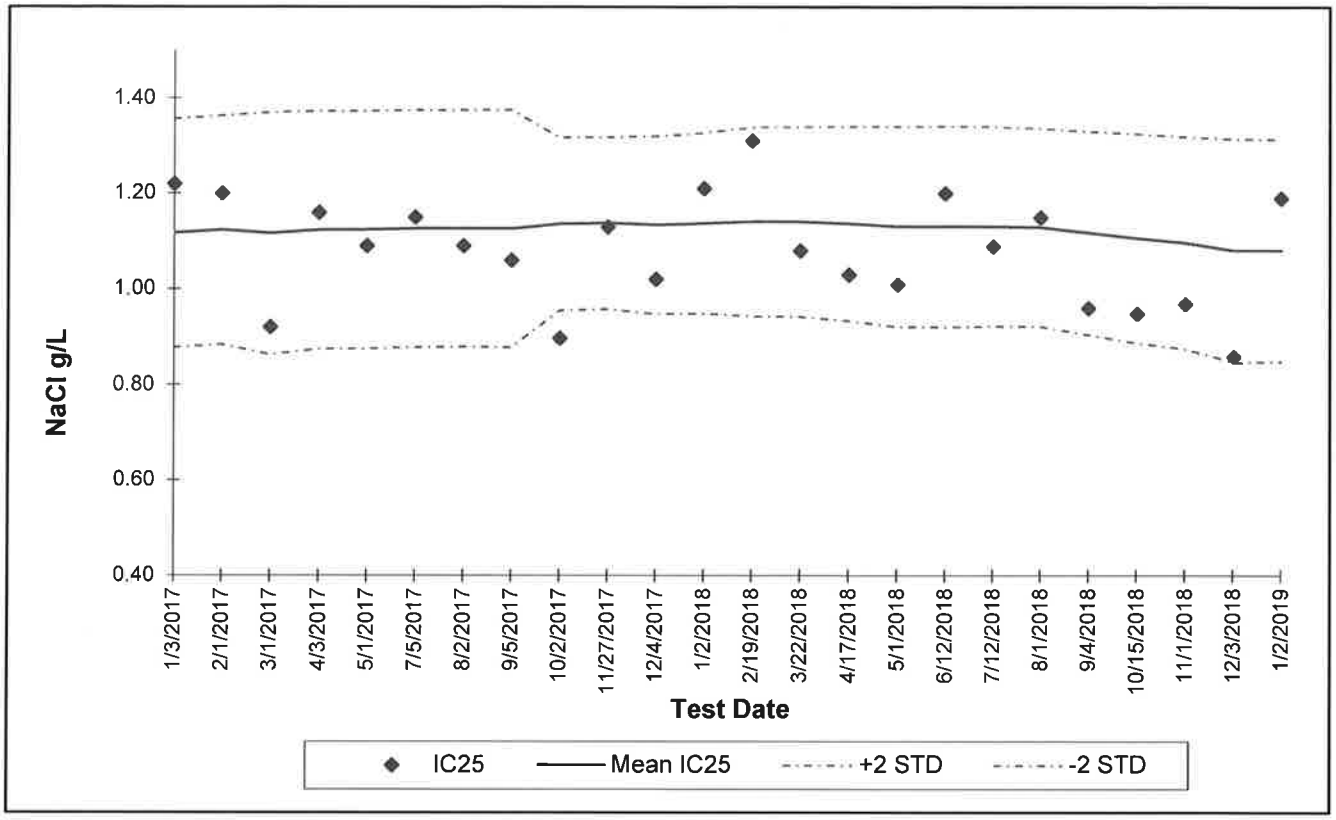
Effluent COC# C38-1101
Receiving Water COC# C38-1102

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO:
KIM WILLS, NEW ENGLAND BIOASSAY 77 BATSON DRIVE MANCHESTER, CT 06042

REFERENCE TOXICANT CHARTS

New England Bioassay

Reference Toxicant Data: Sodium chloride (NaCl) *Ceriodaphia dubia* Chronic Reproduction IC_{25}



Test ID	Date	IC_{25}	Mean IC_{25}	STD	-2STD	+2STD	Avg. CV	Repro PMSD (%)	Avg. PMSD (%)
17-14	1/3/2017	1.22	1.12	0.12	0.88	1.36	0.11	10.80	15.85
17-151	2/1/2017	1.20	1.12	0.12	0.88	1.36	0.11	7.93	15.28
17-267	3/1/2017	0.92	1.12	0.13	0.86	1.37	0.11	16.70	15.37
17-480	4/3/2017	1.16	1.12	0.12	0.87	1.37	0.11	13.66	15.27
17-616	5/1/2017	1.09	1.12	0.12	0.88	1.37	0.11	8.00	14.84
17-972	7/5/2017	1.15	1.13	0.12	0.88	1.37	0.11	12.67	14.72
17-1146	8/2/2017	1.09	1.13	0.12	0.88	1.38	0.11	23.94	15.20
17-1317	9/5/2017	1.06	1.13	0.12	0.88	1.38	0.11	33.78	16.13
17-1516	10/2/2017	0.90	1.14	0.09	0.95	1.32	0.08	24.47	16.53
17-1787	11/27/2017	1.13	1.14	0.09	0.96	1.32	0.08	19.97	16.69
17-1846	12/4/2017	1.02	1.13	0.09	0.95	1.32	0.08	14.69	16.60
18-10	1/2/2018	1.21	1.14	0.09	0.95	1.33	0.08	10.81	16.36
18-271	2/19/2018	1.31	1.14	0.10	0.94	1.34	0.09	22.90	16.56
18-416	3/22/2018	1.08	1.14	0.10	0.94	1.34	0.09	17.59	16.88
18-553	4/17/2018	1.03	1.14	0.10	0.93	1.34	0.09	38.54	17.77
18-607	5/1/2018	1.01	1.13	0.10	0.92	1.34	0.09	24.65	18.25
18-816	6/12/2018	1.20	1.13	0.11	0.92	1.34	0.09	46.97	19.59
18-996	7/12/2018	1.09	1.13	0.10	0.92	1.34	0.09	11.41	19.70
18-1103	8/1/2018	1.15	1.13	0.10	0.92	1.34	0.09	17.23	19.67
18-1315	9/4/2018	0.96	1.12	0.11	0.91	1.33	0.10	22.12	20.09
18-1577	10/15/2018	0.95	1.11	0.11	0.89	1.33	0.10	24.32	20.64
18-1625	11/1/2018	0.97	1.10	0.11	0.88	1.32	0.10	31.57	21.34
18-1756	12/3/2018	0.86	1.08	0.12	0.85	1.32	0.11	15.77	21.00
19-8	1/2/2019	1.19	1.08	0.12	0.85	1.31	0.11	40.72	21.30

National 75th Percentile and 90th Percentile CV Averages for Ceriodaphnia Reproduction IC25 (EPA 833-R-00-003): 0.45 - 0.62
PMSD Upper and Lower Bounds for Ceriodaphnia Reproduction (EPA-821-R-02-013): 13% - 47%